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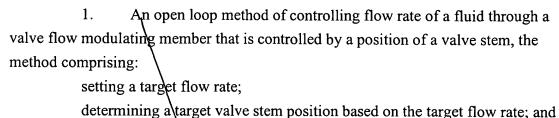
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2.







- determining a target valve stem position based on the target flow rate; and adjusting the valve stem position until a position of the valve stem matches the target valve stem position.
- position comprises:
  determining a pressure coefficient;
  calculating a flow area of the valve flow modulating member; and

The method of claim 1, wherein determining the target valve stem

determining a valve stem position corresponding to the calculated flow area.

- 1 3. The method of claim 2, wherein calculating the flow area of the valve flow modulating member comprises using the measured flow rate and the determined pressure coefficient.
  - 4. The method of claim 2, wherein determining the valve stem position comprises using a predetermined relationship between the valve stem position and the flow area.
- 5. The method of claim 2, wherein calculating the flow area of the valve flow modulating member comprises modelling flow rate through the valve flow modulating member to determine a relationship between a function of fluid pressure upstream and downstream from the valve flow modulating member, the flow area of the valve flow modulating member, and the flow rate through the valve flow modulating member.
- 1 6. The method of claim 5, wherein the modelling assumes that an internal energy of the fluid is constant across the valve flow modulating member.

- 7. The method of claim 5, wherein the modelling assumes that a density of the fluid remains substantially constant across the valve flow modulating member.
- 1 8. The method of claim 2, wherein the fluid is in a gaseous state.
- 1 9. The method of claim 8, wherein calculating the flow area of the valve
- 2 flow modulating member comprises estimating a pressure of the fluid upstream from the
- 3 valve flow modulating member and a pressure of the fluid downstream from the valve
- 4 flow modulating member.
- 1 10. The method of claim 8, wherein the pressure coefficient includes a squared pressure difference ratio.
- 1 11. The method of claim 8, wherein the pressure coefficient is estimated using maximum and minimum flow conditions.
- 1 12. The method of claim 2, wherein the fluid is in a liquid state.
- 1 13. The method of claim 12, wherein the pressure coefficient is estimated using maximum and minimum flow conditions.
- 1 14. The method of claim 12, wherein calculating the flow area of the valve
- 2 flow modulating member comprises estimating a pressure of fluid upstream from the
- 3 valve flow modulating member and a pressure of the fluid downstream from the valve
- 4 flow modulating member.
- 1 15. The method of claim 12, wherein the pressure coefficient includes a
- 2 ratio of the difference in the upstream pressure and the downstream pressure when the
- 3 valve flow modulating member is fully open to the difference in the upstream pressure
- and the downstream pressure when the valve flow modulating member is fully closed.



1	16. A valve positioner system that controls a flow rate of a fluid through a
2	valve flow modulating member that is controlled by a position of a valve stem, the
3	system comprising:
4	a valve positioner coupled to the valve stem and configured to measure a
5	position of the valve stem;
6	a feed-forward flow controller configured to:
7	receive the measured valve stem position from the valve positioner,
8	receive the target flow rate from the flow controller, and
9	calculate a target valve stem position based on the target flow rate;
10	wherein the valve positioner adjusts the valve stem position until a position of
11	the valve stem matches the target valve stem position.
1	17. The system of claim 16, wherein the feed-forward flow controller is
2	configured to determine a pressure coefficient that is based on one or more estimates of
3	the pressure of the fluid relative to the valve flow modulating member.
1	18. The system of claim 17, wherein the feed-forward flow controller is
2	configured to:
3	calculate a flow area of the valve flow modulating member that corresponds to
4	the measured valve stem position; and
5	calculate a flow rate based on the calculated flow area and the pressure
6	coefficient.
1	19. The system of claim 18, wherein the target valve stem position is
2	calculated based on the calculated flow area.
1	20. The system of claim 19, wherein calculating the target valve stem

2 position comprises using a predetermined relationship between valve stem position and a

3 flow area of the valve flow modulating member.



1	21. The system of claim 18, wherein calculating the flow area comprises
2	using a predetermined relationship between valve stem position and a flow area of the
3	valve flow modulating member.
1	22. The system of claim 18, wherein calculating the flow area of the value

- of claim 18, wherein calculating the flow area of the valve 2 flow modulating member comprises modelling flow rate through the valve flow modulating member to determine a relationship between a function of fluid pressure upstream and downstream from the valve flow modulating member, the flow area of the valve flow modulating member, and the flow rate through the valve flow modulating member.
- The system of claim 22, wherein the fluid is in a gaseous state. 23. 1
- 24. 1 The system of claim 23, wherein the modelling assumes that an internal energy of the fluid is constant across the valve flow modulating member.
- 25. The system of claim 22, wherein the fluid is in a liquid state. 1
- 1 26. The system of claim 25, wherein the modelling assumes that a density 2 of the fluid remains substantially constant across the valve flow modulating member.
- 27. A valve positioner system that controls a flow rate of a fluid through a 1 valve flow modulating member that is controlled by a position of a valve stem, the 3 system comprising: a valve positioner coupled to the valve stem and configured to measure a 4
- position of the valve stem; and
- a feed-forward flow controller configured to: 6
- 7 receive the measured valve stem position from the valve positioner,
- 8 receive the target flow rate from the flow controller,
- receive a pressure coefficient, 9
- calculate a first flow area based on the target flow rate and the pressure 10
- coefficient: 11

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calculate a second flow area that corresponds to the measured valve 12 stem position, 13 calculate a flow rate based on the calculated second flow area and the 14 pressure coefficient, 15 calculate a target valve stem position based on the calculated first flow 16 area; 17 wherein the valve positioner adjusts the valve stem position until a position of 18 the valve stem matches the target valve stem position. 19